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The Chemotherapy of Bacterial Infections*

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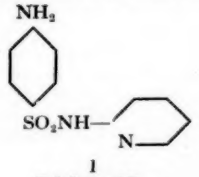
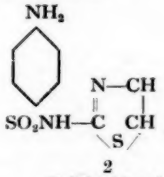
IMPERIAL CHEMICAL INDUSTRIES (DYESTUFFS), LTD.,
MANCHESTER

DISCOVERY.—Domagk (1935) published the results of the successful treatment of experimental streptococcal infections in mice by an azo dyestuff. Later in the same year Fourneau showed that the dyestuff was reduced in the body to a colourless compound, *p*-aminobenzenesulphonamide, which had been prepared and described in 1908, and that this simpler compound was entirely responsible for the therapeutic effect. This compound not being patentable, many firms soon began to market it under a variety of trade names, thereby causing much confusion. The non-proprietary name of "sulphanilamide" has been approved for *p*-aminobenzenesulphonamide.

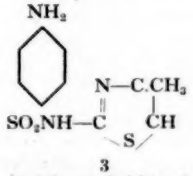
DEVELOPMENT.—Since 1935 a great variety of derivatives of sulphanilamide has been made—the latest review lists 1,300 published compounds. Many more have been made in commercial laboratories and not reported in the literature. For example, I.C.I. have made approximately 400 such derivatives. From all this work, the only fundamental advance was the synthesis of the pyridyl derivative which has become known as M & B 693. This has the same activity as the parent compound, but is also markedly effective against the pneumococcus, gonococcus and meningococcus. Replacement of the pyridyl group of M & B 693 by other heterocyclic ring systems has led to the preparation of the following compounds :—



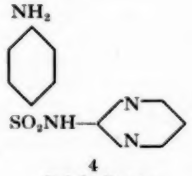
1
Sulphapyridine
(M & B 693)



2
Sulphathiazole



3
Sulpha-methylthiazole

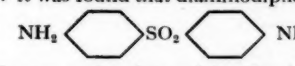


4
Sulphadiazine

* Paper presented, in association with a demonstration on antiseptic tests—*in vitro* and *in vivo* therapeutic tests with sulphanilamide compounds—at the meeting of the Lancashire Division, N.V.M.A., held at Manchester on July 11th, 1941.

It is claimed that 2 and 3 above are active against staphylococci, but this is still doubtful since reliable evidence is difficult to obtain. Sulphadiazine is said to be a definite advance on sulphapyridine from the pharmacological point of view, since it is excreted more slowly (thus reducing the frequency of dosage) and causes less nausea.

In 1937 it was found that diaminodiphenyl sulphone



was much more active than sulphanilamide on streptococcal infections of mice. This compound is very toxic to mice and to men, but not to large animals. Attempts to use this compound and less toxic derivatives of it for human medicine have now been almost abandoned, but it may have possible veterinary uses.

CLINICAL USES.—The first great success with sulphanilamide was in the treatment of *puerperal sepsis*, where the mortality was reduced from about 25 per cent. to 3 per cent. The mortality from *erysipelas*—another common streptococcal infection—has been roughly halved and the duration of illness much reduced. Striking success has also been obtained in the treatment of *streptococcal meningitis*. Sulphanilamide is also of considerable value in cases of *cystitis* due to *Bacterium coli*.

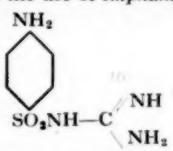
In veterinary work sulphanilamide has been used with varying success in many different bacterial infections of horses, pigs, dogs and cattle.

The results of the treatment of *bovine mastitis* have been promising. This disease is frequently caused by types of streptococci more resistant to sulphanilamide than are those causing the virulent infections of humans. About 60 per cent. of affected cows are cured, although the disease may often be arrested and the symptoms alleviated.

Since the advent of sulphapyridine there has been a tendency to use this compound in preference to sulphanilamide. Its action on streptococci is equal to that of sulphanilamide but its range of action is wider. With it the mortality from *pneumococcal pneumonia* has been reduced from about 28 per cent. to 7 per cent. and of *pneumococcal meningitis* from practically 100 per cent. to about 35 per cent. The treatment of *gonorrhoea* has been revolutionised, since complete cures may now be obtained in a fraction of the time formerly needed when local treatment only was possible.

RECENT DEVELOPMENTS AND POSSIBLE ADVANCES.—Whilst success in the oral treatment and prophylaxis with sulphanilamide of infections with the anaerobic organisms causing *gas gangrene* was claimed quite early, even more striking results have been shown to be obtainable both clinically and experimentally by the packing of large contaminated wounds and fractures with powdered sulphanilamide or sulphapyridine. In this way, slow absorption occurs and a high local concentration of the bactericidal agent is maintained for a long time.

Another example of the maintenance of a high local concentration of drug is the use of *sulphanilylguanidine*,



in the treatment of intestinal infections. Although fairly soluble, this compound is very slowly absorbed from the intestinal tract. Preliminary reports only of its use have yet appeared. If confirmed, this opens up an extensive field for further development.

The control of staphylococcal infections in man and animals is a most important problem not yet solved. The sulphanilamide drugs are occasionally helpful but the more active sulphone is too toxic for human use.

Finally, it may be said that active search for new types of compound effective against the many organisms not controlled by the drugs already available is being pursued in this and many other laboratories.

Sulphanilamide Treatment of Streptococcal Infections in Horses*†

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During the last 15 months numerous opportunities have occurred for the experimental treatment of equines infected by beta haemolytic streptococci (Group C, Lancefield).

The methods suggested in two previous publications (Bazeley, Jakobowicz and Splatt, 1939; Bazeley, 1940) have been followed as closely as possible, both as regards the dose rates and the route of administration. Unless otherwise mentioned, the nasopharyngeal tube with pressure bottle outfit was used invariably, so introducing a fine suspension of the drug in generous quantities of water into the stomach, without waste or difficulty. This method has proved entirely satisfactory in extended practice, and may be recommended thoroughly as safe and rapid with any drug, and almost the only practical method in the case of sulphanilamide.

Thirteen cases of streptococcal infection have been treated, all more or less severe in nature. The details of these are given.

Chronic Sinusitis (Secondary Infection). 1.5.39. This case is a curiosity, although demonstrating the effectiveness of sulphanilamide against haemolytic streptococci. A profuse yellow discharge from the right nostril of an aged gelding led finally to a diagnosis of sinusitis. Bacteriological examination of the discharge showed a pure infection of one type of haemolytic streptococcus.

Doses of 60 g. of powdered sulphanilamide (weight of horse 1,000 lb.) were then given by the nasopharygeal route on each of the five following days, by which time the discharge had ceased. Then followed a rest period of nine days, during which the animal gained 18 lb. in weight.

On the tenth day a slight yellow discharge was again noticed from from the right nostril. The horse was then started on a second five-day course of 60 g. suphanilamide daily. At the end of this period there was no sign of discharge, and swabs were negative for haemolytic streptococci.

Five weeks later, however, the animal showed marked softening and swelling in the right temporal region, involving the supraorbital process and the eye. This swelling progressed so rapidly that destruction was decided on.

The autopsy showed the whole of the right maxillary sinuses and the right frontal sinus completely filled by a carcinoma. This had rarified the bone in the temporal region, and by expanding there caused the swelling mentioned above.

Sections of the growth, which also extended over to the left frontal sinus, verified the diagnosis of carcinoma which was apparently due to anaplastic cells of the nervous type found in the anterior pituitary gland. (Remnants of this body are believed to exist in the median raphae of the soft palate. The growth could be traced down to this region from the lower portion of the affected maxillary sinus.)

Of interest is that sulphanilamide can apparently eliminate a secondary streptococcal infection in a most unfavourable site—a rapidly progressing carcinoma.

Broken Rib and Early Pleurisy. 30.3.40. An aged gelding remount was evacuated with a compound multiple fracture of the tenth right rib, the break occurring about two-thirds along its length ventrally. Broken bone showed in the wound, which was opened further at the base hospital for drainage. This wound was badly infected and exuded considerable quantities of pus. A firm oedema, presumably due to toxin liberated from the site of infection, existed around the site with a 9 inch radius and extended backwards and under the belly for 18 inches. This flat swelling was raised about two inches above the normal surface lines.

Breathing was fast (50) and painful. Pulse 70. Temp. 102·5° F. A dry pleurisy could be detected on auscultation, the whole thorax being extremely sore to touch. No evidence of pleuritic fluid was found. The extent of oedema around the wound prevented close examination of pleural surfaces in this region.

The animal was given 60 g. sulphanilamide by nasal tube in two pints of water.

31.3.40. Temp. 101·2°. Breathing was easier and slower (25). Pulse 50. The oedema was unaltered, but the horse appeared generally better. He was dosed with 40 g. sulphanilamide. A swab of the wound taken the previous day showed haemolytic streptococci in large numbers.

1.4.40. Temp. 100·2°. Breathing and pulse normal, with the oedema slightly reduced. The horse was feeding and comfortable. The 40 g. dose of sulphanilamide was repeated.

2.4.40. Temp. 98·0°. The horse seemed listless, but otherwise normal. The wound was discharging yellow pus freely, while the oedema was almost entirely gone. No trace of pleuritic fluid could be detected.

4.4.40. A rise of temperature to 102·4° occasioned

* This has been carried out within the limits of sulphanilamide supplies available. Portion of the work was only possible because of a gift of 1,000 grammes by Messrs. Felton, Grimwade and Duerdins, of Melbourne, for use in army horses. Also much appreciated co-operation in the actual treatment and diagnosis of a number of cases was given by Mr. L. F. McManamny, B.V.SC., a practitioner, and Captain R. Burns, of the Australian Army Veterinary Corps.

† Reproduced from *The Australian Veterinary Journal*, October 1940. **16**. 187-193.

some alarm. Respirations went to 35 and pulse to 50. The animal was immediately replaced on sulphanilamide, 40 g. being administered.

5.4.40. Temp. 100·3°. Respirations and pulse normal. The 40 g. dose of sulphanilamide was repeated.

6.4.40. The horse continued to be normal, with wound discharging but healing well. He was given another 40 g. sulphanilamide.

8.4.40. By this time the animal was making a good recovery, and was allowed out in an open yard for sunlight.

The value of sulphanilamide in this case was undoubted, as it appeared certain that the animal would develop a severe pleurisy as a result of the wound infection and penetration. In addition, the toxic products of the wound infection were influencing the animal's vitality. Sulphanilamide was used, however, to protect against severe pleurisy more than to treat it, since the degree of this complication was slight to commence with.

Pneumonia.—This case was admitted to the sick-lines in an army camp, with a profuse bilateral nasal discharge of a creamy nature. A diagnosis of nasal catarrh was made. A swab taken showed one type of haemolytic streptococci in pure culture.

Immediately after admission a very cold spell of weather occurred. Four days later the animal was obviously suffering from bronchopneumonia. Respirations were 50, pulse 50 and temperature 105·4° F. The lower three-quarters of both lungs were consolidated on percussion, whilst the nasal discharge had become more voluminous and somewhat clotted in nature.

Intravenous injections of acriflavine were tried for the next three days, 40 ml. of a 1 per cent. solution in distilled water being given on each day. This appeared to keep the complaint in check and reduced the temperature to 103·7° F., but the horse nevertheless remained in a serious condition, suffering great embarrassment from the infection. Swabs taken at this period showed a pure infection of the same streptococcus found on the admittance of the case.

The nasal discharge also showed some canary-yellow staining, due presumably to the acriflavine administered. However, as the main result of acriflavine therapy had been to check the course of the disease and reduce the fever, and not to clear the infection, a course of sulphanilamide was decided on.

50 g. of the powdered drug was then given on each of the following three days by the nasopharyngeal tube. At the end of this period the heavy nasal discharge had become thin and watery, with a few whitish clots showing, while the animal's general condition, pulse, respiration and temperature had become normal.

Temperatures for four days:—

8.12.39: 12 a.m.: 103·7°: Sulphanilamide commenced.
5 p.m.: 102·7°.
9.12.39: 12 a.m.: 101·5°: First 24 hours of sulphanilamide therapy.
10.12.39.: 12 a.m.: 101·0°: Second 24 hours of sulphanilamide therapy.
11.12.39: 12 a.m.: 100·0°: Third 24 hours of sulphanilamide therapy.
12.12.39: 12 a.m.: 100·1°: First 24 hours after sulphanilamide ceased.
14.12.39: 100·2°.

An uneventful recovery was made from this point, with the consolidation in the lungs gradually decreasing until full resonance could be obtained over all sections on 23.12.39.

Nasal Catarrh in Two Army Horses.—The accepted term for this disease is used here, although the actual site of infection is probably the upper trachea, larynx and pharynx. These were typical fresh cases, such as are admitted to sick-lines each day.

6.4.40. Treatment with powdered sulphanilamide was commenced at once, each animal receiving 40 g. a day in one dose by means of the nasopharyngeal tube. Both horses weighed about 900 lb.

Case A, an aged chestnut gelding, had an extremely copious white discharge from both nostrils, which showed the usual haemolytic streptococcus on examination. Temperature was normal—100·2° F. (This is found to the case very often.) A purulent conjunctivitis was present, the conjunctivae being extremely injected. The animal was very depressed and had not eaten for four days.

Case B, a brown gelding four years old, represented the other extreme of the range of these respiratory catarrh cases, as it had first been noticed ill the previous morning. A copious discharge poured from both nostrils. The animal was dull, its breathing very rapid (90) and distressed, pulse 50, while the temperature was 103·4° F. A swab of the nasal discharge later showed the typical haemolytic streptococcus of these infections in pure culture.

7.4.40. Case A had commenced feeding again, but the general condition was unaltered, except that the conjunctival discharge had dried up. Temperature 100·2° F. The nasal discharge still copious.

Case B's temperature had fallen to 100·4° F., with the nasal discharge much reduced and respirations down to 35. Pulse steady at 40.

8.4.40. This was the third and last day on which sulphanilamide was given.

Case A's nasal discharge had become reduced in amount and finely clotted. Temperature 99·8° F., with respirations 12 to 15 and pulse 50. The general condition was much better.

Case B had no discernible nasal discharge, and was lively in himself. Temperature 100·0° F. Respirations 12 to 15, and pulse 60.

9.4.40. Case A's nostrils showed scarcely any discharge, and, judging by his coat, he was improving in condition rapidly.

Case B had apparently made a complete recovery after three days' treatment on the sick-lines.

Both animals remained free from discharge from this point onwards, and were not reported as suffering from nasal catarrh later. Each went back to work immediately in his troop.

Nasal Catarrh in Two Horses Freshly Introduced to a Stable.—*Case A.* 15.4.40. A three-year-old mare (648), introduced to these stables three days previously, developed a whitish nasal discharge of a copious nature. Temperature 102·8°, pulse 60, with respirations fast and laboured. 60 g. sulphanilamide was given by the nasopharyngeal tube.

16.4.40. The nasal discharge remained copious, but the horse appeared much better. Temperature 100·6°. Pulse and respirations both normal. A second dose of 40 g. sulphanilamide was given. A swab taken the previous day showed haemolytic streptococci in pure culture.

17.4.40. Temperature 100·4°. Discharge lessened, with the animal otherwise normal. The 40 g. dose of sulphanilamide was repeated.

18.4.40. The nasal discharge had become less and was drying up. Temperature 100·3° F.

From this point onwards the horse made a quick recovery, with the nasal discharge clearing up completely by 20.4.40. No further trouble was experienced, although the horse was given a large immunising dose on 18.4.40.

Case B. 10.5.39. A six-year-old mare, recently purchased, was reported to have been suffering from a continuous low-grade fever and a profuse nasal discharge. There were no head symptoms, but the pulse rate was 60, temperature 102·5°, with respirations 35 and forced. A nasal swab showed a mixed infection of *Streptococcus equi* and *Streptococcus pyogenes.*

The animal was given 65 g. sulphanilamide, suspended in 150 ml. normal saline, as a sterile subcutaneous injection• in one site on a shoulder.

11.5.39. The sulphanilamide dose was repeated on the opposite shoulder. Condition about the same. Temperature 101·8° F.

12.5.39. The same dose of sulphanilamide was again given. Temperature 101·1° F. The condition of the horse was unchanged, with the nasal discharge still evident.

15.5.39. By this date a gradual improvement in condition had commenced. The temperature remained around 99·8°-100° F. throughout, while the discharge vanished. The slow response was obviously due to delayed absorption of the drug (Bazeley, Jakobowicz and Splatt, 1939), which only reached its peak on 12.5.39 and remained appreciable until 17.5.39.

20.5.39. A nasal swab proved to be negative for haemolytic streptococci.

Purpura Haemorrhagica with Secondary Respiratory Infection. 1.4.40. A six-year-old chestnut gelding was evacuated to a base hospital suffering from early purpura haemorrhagica.

The hind legs were swollen to the rump, being quite hard and lumpy. They were about twice normal thickness in their lower halves. The left foreleg was also swollen to about the same degree, extending above the knee. There were also large ecchymoses in both eyes.

A slight nasal discharge was evident. The pulse was 70 and temperature 101·2° F. Leg swellings had been noticeable for four days previously, but had suddenly reached the large size on the previous day.

An intravenous injection of 200 ml. of an experimental strangles antitoxic serum was given.

2.4.40. Twenty-four hours later the leg swellings had noticeably reduced and were soft. There were no further visible haemorrhages or extensions to existing ones.

The animal, however, was running a temperature of 103·8° F., while the pulse was 80 and respirations 40, with a copious nasal discharge. Swabs taken the previous day showed a mixed infection in the nasal discharge of *Streptococcus equi* and *Streptococcus pyogenes.* Examination revealed that the animal was suffering from a severe upper respiratory infection, and since previous experience of purpura cases showed that this would in all probability deteriorate to fatal pneumonia, it was decided to administer sulphanilamide as a protective measure. 50 g. powdered sulphanilamide was given suspended in water, by the nasopharyngeal tube.

3.4.40. The respiratory condition was appreciably improved. Pulse 50. Temperature 102·0° F. Respirations 28 and steady. The discharge was still copious. The purpura swellings had also reduced further.

Another 40 g. sulphanilamide was administered by the same method.

4.4.40. The animal's respiratory condition was much better, with the discharge less and apparently drying up. Temperature 100·3° F. Pulse and respirations normal.

The legs, however, had again swelled almost to the previous large size.

40 g. sulphanilamide was again administered by the nasopharygeal tube and 200 ml. strangles anti-toxic serum injected intravenously.

5.4.40. The nasal discharge had almost disappeared, while the legs were reduced in size once more.

From this date the horse made an uneventful but steady recovery to normality, without a recurrence of either of these complications.

Miscellaneous Nasal Catarrh Cases. Five cases of chronic respiratory catarrh were treated. All had been noted for the length of time the condition already existed in the animal, ranging from 10 days to 24 days. Throughout this period a cream-coloured discharge had been present in the nostrils, whilst the animals were also unfit to work. Each case was also examined bacteriologically, and the presence of haemolytic streptococci in the discharges confirmed.

Three horses in an army camp were given 50 g. of powdered sulphanilamide on each of two consecutive days by the nasopharyngeal route. These cases did not respond at once. Two, five and six days passed before the discharges ceased. However, recoveries were complete at this stage.

Two horses in a racing stable were given daily a 50 g. dose of powdered sulphanilamide, evenly mixed in moistened chaff and bran. Two separate courses of therapy, lasting five consecutive days each, were needed before the catarrh began to subside. Recovery was complete in each case within seven days after the last dose.

Probably the mode of administration was responsible for the slow response in the latter case, as undoubtedly some drug is wasted during feeding, while another portion may be combined with ingesta and so rendered useless.

A Case of Strangles. A typical case of strangles was treated with sulphanilamide to determine the effect of the drug on an abscess already well formed. Therapy was commenced, two days after diagnosis on sick-lines, using the nasopharyngeal route.

First day: 50 g. powdered sulphanilamide.
Second day: 50 g. powdered sulphanilamide.
Third day: 50 g. powdered sulphanilamide.
Fourth day: 70 g. powdered sulphanilamide.

Treatment was discontinued at this stage because the abscess appeared to be losing its firmness and becoming more fluid in nature, *i.e.*, about to "ripen." It had not decreased in size, which, throughout the treatment, had been roughly three inches in diameter and spherical. It was located in the usual submaxillary region, being a left-sided abscess.

Other than reducing the animal's temperature from 101·2° F. to 99·4° F. during the four days and dispersing the oedema over the swelling, the drug appeared to have little effect on the progress of the abscess, which was opened several days later, after the evacuation of the horse to base hospital.

DISCUSSION

In this country infections in the horse, whether primary or secondary, appear to be almost invariably streptococcal.

• Note.—This method of administering sulphanilamide cannot be recommended, as the drug is an irritant and may produce severe sterile abscesses.

In many of the cases mentioned, sulphanilamide therapy was commenced before this fact had been ascertained, but in no case was it found subsequently that a non-streptococcal infection had been treated. Consequently there is no evidence in these cases of the drug's effectiveness against other organisms.

Of the 13 cases of streptococcal infection treated by sulphanilamide, only one failed to show decided benefit from it. This was the case of strangles treated only to determine the effect of the drug on a forming abscess. It is regretted that a very early abscess was not available for treatment, as possibly here sulphanilamide may be of value, if given before the pus pocket is well formed.

Among the 12 cases in which the drug apparently exerted a beneficial influence, the most rapid results occurred in the more acute complaints. It seems safe to say that sulphanilamide is highly effective in acute beta haemolytic streptococcal infections, moderately so in sub-acute ones, and of value in pronounced chronic cases.

Respiratory infections, in particular, offer the drug a big field, since it is markedly effective in helping the animal to throw these off. A feature noted, however, is that, while acute respiratory cases respond to a few doses quickly, chronic cases may require prolonged treatment. To avoid tolerance of the organism to the drug being developed, it is suggested that four- or five-day periods of treatment, followed by equal periods of rest, would be best in chronic cases.

There is another aspect of sulphanilamide therapy yet to be determined. Does the drug, by aiding the animal to eliminate the organism as a pathogen, help in the production of a lasting immunity to that particular type? Or is the animal openly susceptible to reinfection at any time after the organism is eliminated?

From the failure to note any recurrence of infection it would appear that the former is more likely to be the case. It is, however, a field to be commended to practitioners for further observations.

Summary

Details of the treatment of 13 animals suffering from severe haemolytic streptococcal infections with sulphanilamide are given.

A response could be said to have occurred in 12 of the 13 cases, indicating the high value of the drug in treating such infections.

In the case of strangles where no beneficial result was obtained, it is fair to say that this had not been expected from the outset of treatment.

References

Bazeley, P. L., Jakobowicz, R., and Splatt, B. (1939.) *Aust. vet. J.* **15**. 199.
——— (1940.) *Aust. vet. J.* **16**. 27.

ETHICAL PHARMACEUTICALS ASSOCIATION

At the sixth Annual General Meeting of the members of the Ethical Pharmaceuticals Association held in London, November 11th, 1941, the Chairman, Mr. W. Beckley, in the course of his report referred to the prevailing conditions which had necessitated some curtailment in members' collective activities. The Chairman pointed out, however, that at the same time there had been a greater call on the services of the Association to deal with individual problems arising out of the operation of the many official regulations and controls, and emphasised the importance of the Association as a medium for the collective approach to post-war problems.

CLINICAL COMMUNICATIONS

A Rare Case of Foreign Body in the Horse

G. S. ALLEN, M.R.C.V.S.,
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Subject.—A three-year-old Shire mare.

Examination.—The patient was first examined on August 10th. The owner stated emphatically that the animal had always been in perfect health until the previous day, when it appeared rather uneasy.

There was now evidence of considerable pain, the horse continually rolling, getting up, and going down again. No dung had been passed for some time, and a tentative diagnosis of "stoppage" was made.

Treatment and Course.—During the day an aloetic bolus, and two draughts of ol. tereb. and ether in linseed oil were given; 2 c.c. of carbamyl choline were injected subcutaneously.

August 11*th*.—Patient appeared rather easier, with no acute attacks of pain; eating a little steamed hay and bran. No dung had passed as yet; heart sounds weak, pulse rapid (*c.* 100) and the temperature was 100° F. I injected 1 c.c. carbamyl choline and 5 c.c. liq. strych.

August 12*th*.—The horse was now passing small quantities of dung, rather soft in character. Respirations were shallow and rapid (80 per min.), but the pulse seemed slightly stronger. Temperature 103°.

August 13*th*.—The patient was now passing quantities of watery faeces, and getting weak; all food was refused. The temperature was 102°.

My suspicions were now aroused, and a very guarded prognosis was given the owner. Thinking, however, that the medicaments had caused super-purgation, I left three draughts, each containing ½ oz. of chlorodyne, to be administered during the course of the day.

August 15*th*.—The weakness gradually increased and the patient died in the course of the morning.

Post-mortem Examination.—This revealed a localised peritonitis, caused by puncture of the duodenum by a straight piece of steel-wire, 5 inches long, and about as thick as a fine knitting-needle.

Discussion.—The interest of the case lies in the great rarity of foreign bodies in the horse, and the writer believes it may be almost unique that such an object could negotiate the oesophagus and the pylorus before being arrested in its travels.

The wire was considerably corroded, but no estimate could be given of the time elapsing between ingestion and the onset of symptoms, apart from the fact that the area of necrosis of the bowel wall was about 2½ inches long and extended about half-way round it.

It would be of interest to know of any other cases recorded by practitioners, and particularly the time (if known) between ingestion and the manifestation of symptoms.

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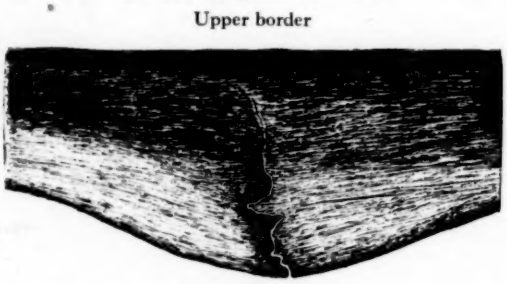
Fractured Ramus of a Horse

H. KIRK, M.R.C.V.S.,
London, N.W.

Recently I was called upon to settle the question as to whether a fracture of the jaw existed in a light

draught horse. Mr. L. Lustig, M.R.C.V.S., of Hendon, had to satisfy his client, for insurance purposes, as to what damage the horse had sustained in a street accident. With my moderate-powered X-ray apparatus, I hardly hoped to obtain any very definite result from radiography, as there is such a mass of dense tissue to pass through. A 10-second exposure was necessary, and as one might expect, it would be very fortunate if any horse did not move even a little during so long an exposure. There was, in fact, some slight movement, but the radiograph revealed a rather well-defined zigzag fracture at the angle of the ramus, extending upwards (on the original film) for 2 inches.

As the original radiograph was found to be unsuitable for reproduction, a line drawing has been made from it, and illustrates its essential features.



The horse was refusing to feed when I saw it, but Mr. Lustig was adopting the measure of supplying liquid nourishment which could be sucked up.

The object of sending this small note is merely to point out that in cases of doubt which might result in litigation, one *can* obtain useful help even from an X-ray unit giving no higher peak voltage than 45,000.

MAXIMUM TILLAGE AREA "VIRTUALLY REACHED"

Mr. Tom Williams, Joint Parliamentary Secretary to the Ministry of Agriculture, speaking at Lincoln, outlined the strategy of forthcoming agricultural campaigns. He pointed out that 4,000,000 acres had been added to the tillage area since war broke out. Whereas in the past two seasons our main task had been ploughing up, our main task now would be to consolidate the gains already made. While committees would be called upon to undertake further ploughing in their counties, it might well be that the maximum tillage area had virtually been reached. In other words, while further considerable areas might be ploughed during the coming season, others might well be allowed to revert to grass. We should now be ploughing as much for improved pasture as for increased arable land.

The call now, Mr. Williams said, is for more wheat for direct human consumption, more sugar beet and potatoes, more protein for livestock, and above all, the maintenance of milk supplies.

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Professor F. C. Bartlett, Professor of Experimental Psychology in the University of Cambridge, has been appointed a member of the Medical Research Council to fill the vacancy caused by the death of Professor A. J. Clark.

ANNOTATION

The Aetiology of Foot-rot in Sheep*

Foot-rot was first recognised to be a contagious disease in France about 1810; Youatt, in 1837, also recognised its contagious nature and stated that infected sheep should be isolated from the rest of the flock. He described how "every portion of horn that is the slightest degree separated from the parts underneath must be cut away."

Despite this knowledge, the disease has been regarded by many agriculturists and some veterinary surgeons as a sporadic disease, occurring particularly in lush pastures, even up to the present day. This is partly because several non-contagious conditions have been included under the general term "foot-rot." True epidemic foot-rot begins with a mild inflammation of the skin in the interdigital space; a breach in the skin-horn junction develops, and during the next five to ten days the infection spreads causing separation of the horn across the whole sole of the foot. Eventually the horn may be almost completely separated from the underlying soft tissue. Both digits and usually more than one foot are involved. Animals of all ages are affected and the disease may continue for a very long time but only exceptionally involves the deeper structures of the foot.

Epidemic foot-rot should be distinguished from the following conditions: Digital suppuration or foot abscess, in which there is usually a considerable amount of pus, the deeper structures of the foot are usually involved, the condition is largely confined to adult animals and to only one digit of the affected foot. Suppurative cellulitis, which commences with patches of dermatitis usually on the back of the pastern; these extend rapidly and may eventually reach as high as the "knee" or hock. Contagious ecthyma in which vesico-pustular lesions may occur around the coronets as well as the mouth. There is also a condition known as "scald" in Australia, which may appear simultaneously in large numbers of sheep and in which there is an inflamed scalded appearance of the skin between the digits with some exudation of serous fluid and often slight separation of the horn particularly around the heels

[The clinical description makes it clear that epidemic foot-rot causes considerable loss in this country, and Beveridge has observed the specific causal organisms in smears from the feet of infected sheep in England. There is also a condition in this country which begins as a small "bleb," containing serous fluid, on the interior aspect of the foot, at the level of the skin-horn junction and may then extend between the digits. This condition may be similar to scald in Australia, but now that true foot-rot can be diagnosed by finding the specific organisms in suitably collected samples the diseases of sheeps' feet will probably become more clearly defined.]

Foot-rot has disappeared from certain regions of Australia, despite the fact that no efforts have been made to prevent its reintroduction, and it would therefore appear that there are certain unknown but

* Beveridge, W. I. B. (1941.) Foot-Rot in Sheep: A Transmissible Disease due to Infection with *Fusiformis nodosus* (n. sp.). Studies on Its Cause, Epidemiology and Control. *Bul. Coun. Sci. and Indust. Res., Australia*, No. 140, 56 pp.

essential predisposing factors. It is more prevalent on improved than natural pastures, and it is well known that moist lush pastures and warm weather predispose to the disease. The Merino is the most susceptible sheep; British breeds are more resistant to infection, but once the disease is established it becomes equally severe. Sheep of 4 to 12 months old appear to be more resistant than others. Goats, but not cattle, are susceptible. The intact healthy skin is resistant to infection, and although it is believed that maceration due to wetness is the chief predisposing factor, injury due to larvae of the nematode *Strongyloides papillosus* may possibly be a common predisposing factor.

It has been shown that foot-rot cannot be set up by standing healthy sheep in "clean" water or mud, but that sheep can be regularly infected by placing them in a pen which has been vacated by infected sheep. Infectivity is never retained in the soil for more than 14 days and usually much less.

An examination of the bacterial flora showed that lesions of foot-rot always contain a gross mixture of bacteria, consisting chiefly of cocci and corynebacteria, near the surface of the lesion. *F. necrophorus* is frequently present and there may be large numbers of a pleuropneumonia-like organism. In the active areas of lesions the most prevalent organisms are usually *Spirochaeta penortha* and a motile fusiform organism. *F. nodosus* is constantly present, but in relatively small numbers. It is a large Gram-negative organism with swollen ends and it is a strict anaerobe.

Inoculation experiments have shown that *F. nodosus* is the primary aetiological agent and that very probably *Sp. penortha* is a specific accessory causal agent. The other organisms present bear no specific relation to foot-rot but they may facilitate the survival of the anaerobic causal agents and *F. necrophorus* may sometimes invade the deeper tissues of the foot.

Control and treatment.—To control an outbreak of foot-rot, or as a preventive measure, all sheep should be passed through a foot bath containing 10 per cent. copper sulphate or 2 per cent. formalin once a week. The feet of affected animals should be trimmed with the knife or secateurs. Various medicaments and methods of treatment have been tried. The most successful method is to dip the foot, after trimming, in a pot containing 30 per cent. copper sulphate, or a 10 per cent. solution of formalin. "Carrier sheep," which can be detected by their deformed feet, should also be treated and, if possible, these and the affected animals isolated from the rest of the flock until they have recovered. The healthy sheep should then, if possible, be placed on clean pasture: this is not difficult because pasture is "clean" if 14 days have elapsed since sheep were last upon it.

Using these methods, foot-rot has been eradicated from several large flocks and it is concluded that, once clean, a flock will remain free of the disease indefinitely, even on wet pasture, if reintroduction of infection is prevented. The eradication of the disease from Australia is now believed to be possible.

JOHN FRANCIS.

The Emergency Committee of the Shire Horse Society has decided not to hold a Shire Stallion Show next spring. The society is to be affiliated to the newly-formed Livestock Export Group.

ABSTRACTS

[SIXTY-FOUR CASES OF TUBERCULOSIS IN HORSES. OPPERMANN, M. (1941.) *Deuts. tierärztl. Wschr.* **49.** 19-22, 37-40, 100.]

During the years 1932-40 a total of 64 cases of tuberculosis in the horse was examined at the Hanover school clinic, and this article describes the clinical findings in considerable detail and summarises them in the form of numerous tables. Tuberculosis was diagnosed in 1·5 per cent. of the horses examined, the highest age incidence being in animals five to eight years old. The disease was seen more often in draught horses (38 cases) than in thoroughbreds (18 cases). The remaining 18 animals were crossbred.

The intradermal tuberculin test was positive in 81·6 per cent. of the animals and in doubtful and negative cases it was supplemented by one of the other types of test. A positive reaction usually took the form of a roughly circular swelling, 6 to 8 cm. in diameter, which was hot and painful. The thickening was continued down the neck for about 20 to 25 cm. by cords about the thickness of a pencil, representing inflamed lymphatic vessels. These, too, were painful on palpation. In other animals the local reaction appeared as a very extensive plaque measuring as much as 20 cm. wide and 50 cm. long. General symptoms were always present and were more severe in draught animals. Negative reactions consisted of swellings not more than 5 cm. in diameter which were not painful, showed no related lymphangitis, and disappeared within 24 hours.

The diagnosis of tuberculosis of the lungs, spleen and mesenteric lymph nodes was made during life in 33, 45 and 30 per cent. of the cases respectively. Lung lesions were recognised by auscultation and percussion; coughing was rare. Enlarged mesenteric nodes were palpated per rectum and were differentiated from verminous aneurysm by faecal examination and a study of differential white cell counts. It was frequently possible to detect splenic lesions by rectal palpation, but in very big horses it was sometimes necessary to distend the stomach in order to bring the posterior border of the spleen within reach of the hand. Clinical examination was also successful in detecting lesions in the liver (1 case), kidney (4), heart (1), skin (3), spinal cord (1) and vertebral column (2).

Of the 64 tuberculous horses, 37 were examined *post-mortem* and the most common sites of tuberculous lesions, in order of their incidence, were as follows: spleen, lungs, liver, mesenteric lymph nodes, kidneys, serous membranes, pharyngeal and cervical lymph nodes.

Repeated examination of blood samples showed that most of the animals were probably suffering from equine infectious anaemia in addition to tuberculosis, and it is suggested that infection with the virus may have predisposed to tuberculous infection.

E. G. W.

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[CLINICAL OBSERVATIONS ON INFLAMMATION OF THE RETROPHARYNGEAL LYMPH NODES OF CATTLE. WYSSMANN, E. (1941.) *Schweiz. Arch. Tierheilk.* **83.** 199-211.]

The author has kept records of 184 cases of inflammation of the retropharyngeal lymph nodes which he

encountered in practice during the years 1903 to 1932. The condition was commonest in cows (109 cases), less common in oxen and calves (66 cases) and only nine cases were seen in young breeding animals. Götze's figures showed that about 80 per cent. of cases are tuberculous.

Disturbed respiration, amounting in some cases to very severe dyspnoea, is the most constant symptom. The animal often makes a snoring or rattling noise, especially during feeding or exercise or when pressure is applied over the region of the pharynx or larynx. When swelling of the glands is very marked the mouth may be held open and there may be danger of asphyxia. There is often a dry, sharp cough and the mucoid nasal discharge may contain particles of food material. Auscultation of the lungs may be difficult or impossible due to the rattling and snoring.

General symptoms—pyrexia, accelerated pulse, etc. —may be present in acute cases, whilst chronic cases lead to marked and rapid loss of condition. The inflamed nodes may rupture into the pharynx but this is more likely to occur when infection is due to pyogenic bacteria than in tuberculous cases. In the latter, there is usually a thick fibrous capsule.

Conditions to be considered in making a differential diagnosis include: tuberculous and actinomycotic laryngitis, acute pharyngitis, parotitis, inflammatory or neoplastic masses in the pharynx.

Recovery is not uncommon even when the condition is tuberculous and Wyssmann estimated that not more than 30 per cent. of his cases succumbed. Organisation and regression of tuberculous lesions may be very striking. Early cases respond well to local treatment with an ointment containing cantharides, which may be made more effective by the addition of croton oil. Alternatively, a strong liniment can be rubbed in for 5 to 10 minutes daily. Potassium iodide, 3 to 6 grammes, should be given daily in the drinking water. Although some veterinarians have tried operative removal of affected lymph nodes or the opening of abscesses, the author does not recommend attempts at surgical treatment of the condition.

E. G. W.

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[PRODUCTION OF HEAT AND OVULATION IN THE ANOESTROUS EWE. Bell, T. D., Casida, L. E., Bohstedt, G., and Darlow, A. E. (1941.) *J. Agric. Res.* **62**. 619.]

Attempts to establish the preliminary physiological state necessary to the successful mating of ewes during their anoestral period are reported by the writers. Three endocrine preparations were used for the purpose: a proprietary preparation—Progynon B. (benzoic-acid ester of dehydro follicular hormone), pregnant-mare serum, and sheep anterior pituitary. The preparation and assay of the latter two are detailed. Presence of oestrus (heat) was checked by the use of " teaser " rams and the state of ovarian stimulation (ovulation) was estimated at the end of the experimental period by the examination of the ovaries of spayed ewes. The claim that ovulation can be detected by changes in the cellular character of the vaginal secretion was simultaneously investigated but not confirmed.

The results indicated that ovulation without heat (oestrus) was regularly produced by the single subcutaneous inoculation of 2·5 gm. (100 rat units) of pregnant-mare serum or four daily doses of anterior-pituitary, total 2·5 gramme equivalent (approximately 50 rat units). The latter produced a higher ovulation rate. Progynon B. (using up to 2,000 rat units in a single or multiple dose) failed to produce heat (oestrus) regularly (positive in five out of eight cases). Simultaneous heat (oestrus) and ovulation were not uniformly produced by a combination of Progynon B. and pregnant-mare serum.

W. T. R.

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[THE OCCURRENCE OF BRUCELLA ABORTUS IN GAME. Witte, J. (1941.) *Berl. Münch. tierärztl. Wschr.* 128-131.]

A review of earlier work on the finding of *Brucella abortus* in game includes references to bison and buffalo (U.S.A.), deer (Germany) and a suggestion that the organism was present in four does with dead foetuses (Germany: no cultural examination).

Witte describes the isolation of *Br. abortus* from a hare which was seen to be unable to run and was shot. There were numerous subcutaneous abscesses and from these an organism was isolated which was identified by cultural, biochemical and serological characters as the bovine type of *Brucella abortus*. It is probable that the source of the infection was contamination of the pastures by cattle; the same explanation applied to the cases of *Br. abortus* infection previously recorded in other wild animals. In the buffalo the characteristic effects of *Br. abortus* infection are abortion and testicular necrosis.

E. G. W.

H.M. STATIONERY OFFICE PUBLICATIONS

The undermentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office.

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Health, Ministry of:		
Gas-contaminated Persons, Treatment of. Instructions for Eye-Douching. (Poster, 30 in. × 20 in.) ... each	0 2	0 3
25	3 0	3 7

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Weekly Wisdom

". . . the cosmic process, which was responsible for human evolution, negates itself by generating the ethical process. The problem then arises of how man is to continuing evolving if the congenitally weak are not killed off. Hitler's solution is substantially to abolish ethics. The correct solution will not be so simple. There is a real contradiction, which will be resolved when men not only realise, as eugenists do, that they ought to control their own evolution, but also possess, as they do not at present, the knowledge and technique necessary for this control."—J. B. S. Haldane, *Nature*, September 20th, 1941, page 344.

IN PARLIAMENT

The following are among the questions and answers recently recorded in the House of Commons:—

Hill-Sheep Farming (Committee)

Major Lloyd (*for* Major McCallum) asked the Secretary of State for Scotland which members of the Committee appointed by him to study the problems of the hill-sheep farming industry in Scotland, have actual practical experience of hill-sheep farming in the Highlands?

Mr. Johnston: The Committee is not intended to be a Committee of representatives of areas, or of experts, or of groups of interests. Many of its members, however, do possess first-hand knowledge of the problems to be dealt with, and the Committee will, I am sure, welcome evidence from men with practical experience in the hill-sheep industry, from whatever part of Scotland they may come.

Mr. Snadden: Has the Committee power to co-opt, for example, representatives of the veterinary profession?

Mr. Johnston: No, Sir.

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Surplus Transport Animals (Disposal)

Mr. Perkins asked the Secretary of State for War what is the present policy of the Army Council in regard to the disposal of horses and transport animals which become surplus to military requirements while abroad?

Captain Margesson: The policy to be followed in regard to the disposal overseas of surplus Army horses and transport animals has been under consideration by the Army Council. It has been decided that all Army horses and transport animals which are taken overseas from this country shall, if they become surplus to military requirements, be either brought back to the United Kingdom or destroyed under military supervision, and that animals acquired abroad shall in similar circumstances as far as practicable be resold in the same area in which they were bought.

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Colonial Development and Warfare

Mr. Riley asked the Under-Secretary of State for the Colonies whether consultations have taken place regarding the desirability of setting up a standing joint committee of both Houses of Parliament, for the purpose of keeping under regular review questions pertaining to the development and well-being of our colonial subjects; and whether anything is being done in the matter?

Mr. George Hall: No consultations have taken place in this matter since the autumn of 1939, when the House was informed that the proposal raised issues of Parliamentary procedure and constitutional practice of a far-reaching character, which would require very careful consideration. My hon. Friend will appreciate, I feel sure, that war conditions do not provide a favourable opportunity for the consideration of such a matter.

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Milk (Cats)

Mr. R. Morgan asked the Parliamentary Secretary to the Ministry of Food the attitude of the Ministry with regard to the provision of a small daily ration of milk for cats, as these animals are a national necessity; and whether such ration can be added to the allowance for human beings?

Major Lloyd George: As my hon. Friend is doubtless aware, there is a shortage of liquid milk at the present time. Therefore any specific allowance of milk for consumption by cats generally could only be provided by reducing the quantity available for human consumption. It is hoped, however, to make arrangements under which limited quantities of damaged dried milk no longer suitable for human food can be issued to owners of warehouses and other food stores in which cats are kept to destroy vermin, and to veterinary hospitals and similar institutions for the use of sick animals. Such supplies cannot, however, be guaranteed.

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Milk (Pasteurisation)

Mr. David Adams asked the Minister of Health what progress has been made in the high temperature short time pasteurisation of milk process; what number of new licences have been granted; and the approximate quantity of milk treated since the issue of Circular 2423 in July?

The Minister of Health (Mr. Ernest Brown): I regret that the information asked for is not available. Returns are obtained of licences under the Milk (Special Designations) Regulations, which are in operation on March 31st each year, and I do not think that I should be justified in now asking local authorities for a special return.

Mr. Adams: As fully one-third of the milk supply of this country is not treated, may I ask whether this information is to be given to the House, so that we may know whether progress has been made or not?

Mr. Brown: I will look at the matter again and see what can be done, and whether the hon. Member's proposal is desirable or not.

. . . . . .

Poultry (Segregation)

Colonel Carver asked the Minister of Agriculture whether there is any method of segregating the sexes of day-old chicks; whether any training is required to do this; and whether he will recommend the destruction of very young cockerels in view of the food situation?

Mr. Hudson: In the case of sex-linked crosses and of certain auto-sexing breeds of fowl such as the Cambar, the sex of day-old chicks may be determined through differences in the colour of down, legs, etc. In other cases, segregation can be effected by trained chick-sexers. The maximum prices fixed for table poultry do not encourage the production of roasting chicken, and poultry keepers have been warned that feeding-stuffs cannot be provided for such birds in wartime. Maximum prices have also recently been reintroduced for petit-poussins, *i.e.*, birds of about eight weeks old, at a level designed to encourage the sale of cockerels as soon as they can readily be identified.

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Goats (Slaughtering)

Colonel Carver asked the Parliamentary Secretary to the Ministry of Food whether, since goat-flesh is now controlled in price, arrangements exist for the humane slaughtering of these animals?

Mr. E. Brown: I have been asked to reply. The Slaughter of Animals Act, 1933, applies to the slaughtering of goats and kids in slaughterhouses within the area of any local authority unless the authority concerned has passed a resolution exempting these animals from the operation of the Act. The information available to me is to the effect that this power has rarely, if ever, been exercised.

The Ministry of Home Security have issued instructions for the storage of radium under war conditions. When not in use, all radium exceeding 1 mgm. in weight must be kept in a 50 ft. borehole or steel container of approved type. Details are given in a leaflet (15,304).

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Speaking at a Bridgwater conference of Parish Councils, Mr. L. Ramsbottom said a survey had been made of all blacksmiths to discover the key men. These were being equipped with modern machinery, and instructors were going round to teach them the use of it, so that they might become agricultural repair engineers as well as farriers.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Dec. 17th.—Meeting of the Section of Comparative Medicine, Royal Society of Medicine, 1, Wimpole Street, W.1, 2 p.m. for 2.30 p.m.
Dec. 17th.—Meeting of N.V.M.A. Tuberculin Tests Committee, 36, Gordon Square, 11.15 a.m.
Dec. 29th.—N.V.M.A. Committee Meetings, 36, Gordon Square, W.C.1.
Dec. 30th.—N.V.M.A. Committee Meetings and Council Meeting.

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The New National Service Bill

The National Service (No. 2) Bill, introduced by the Minister of Labour on December 4th, has as its main object the declaration that a liability rests on all persons, of either sex, who are for the time being in Great Britain, to undertake some form of national service, whether in the Armed Forces of the Crown, in Civil Defence, in industry or otherwise.

Amongst its provisions, the Bill amends the National Service Acts so as to raise the upper limit of age from 41 to 51, it being contemplated that men above the age of 40 should be posted only for "static sedentary" duties. The Bill also extends the National Service Acts to women (20-30 years of age, in the first instance, and exempting married women), enabling them to be recruited for the Royal Naval Service, the auxiliary services and any Civil Defence Force.

It has been decided that the system of block reservation under the Schedule of Reserved Occupations must in general be replaced gradually by a system of individual deferments under which each individual case will come under review. This transition will be effected by raising the age of reservation as shown in the December, 1941, Revise of the Schedule of Reserved Occupations by one year steps at monthly intervals beginning at January 1st. The scheme will not apply to certain classes of men covered by the present Schedule of Reserved Occupations, and amongst these unaffected classes is the veterinary surgeon.

Although the lower age limit in the National Service Acts is 18 years, men have not hitherto been posted to the Forces below the age of 19. It has now been decided that this should be reduced to 18½. A Royal Proclamation made on November 27th extends the liability for service to men who on that date had reached the age of 18 and the first half of the 1923 age class (*i.e.*, men born between January 1st and June 30th, 1923, both dates inclusive) will be required to register on December 13th. They will not be required to join their units before January, by which time they will all have reached the age of 18½.

Special arrangements will be made as on the occasion of the registration of the 1921 and 1922 age classes for the deferment of the calling up of industrial apprentices, to enable students who are acquiring scientific and technical qualifications of great value to the war effort to complete their courses, for enabling boys at school studying for a Higher Certificate or a comparable examination in the summer to take such examination, and to enable men in their first year at the University to attest into the Forces and complete their first year course while undergoing military training in the Senior Training Corps or University Air Squadron. The existing arrangements in respect of the reservation of medical, veterinary and dental students remain in operation.

From the time of writing (December 9th) the House of Commons will give its attention exclusively to the consideration of this Bill until it has been passed through all stages. If need be there will be an extra sitting so that delay may be avoided. The Bill's passage through the House of Lords will be even more speedy so that it will be on the Statute Book well before Christmas.

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PART-TIME LOCAL VETERINARY INSPECTORS

A Superannuation Scheme

The N.V.M.A. has received from one of its Divisions a resolution asking it to explore the possibility of organising a superannuation scheme for members of the Association who are employed by the Animal Health Division of the Ministry of Agriculture as part-time Local Veterinary Inspectors.

This suggestion arises out of the rule that all such appointments come to an end at the age of 65. The effect of this is that on attaining that age, such part-time inspectors have either to relinquish their appointment, or, if they wish to retain the Ministry work in their practice, to take in a junior partner. In many cases this involves the veterinary surgeon concerned in considerable loss financially and the idea behind the resolution was to see whether it was possible to evolve a scheme which would enable these men to make provision for the time when they could no longer rely on these fees from the Ministry.

As a result, the view was sought of the insurance broker who arranged the Pension and Family Provision Scheme which in March, 1933, was unanimously adopted for its members by the Council of the Association, and who has a very wide experience of all forms of Group Insurance and Pension Schemes. The resultant enquiry gave him the opportunity of re-estimating the value of the benefits originally secured. Whilst some modification of benefits has been necessary since 1933, partly on account of the lower net interest earnings of Insurance Companies generally as well as conditions brought about by the present hostilities, careful comparisons with other leading Insurance Companies showed that the terms offered were still exceptionally favourable.

The conclusion was therefore reached that, bearing in mind that a "Group" Insurance Contract, as generally understood, is not practicable for reasons of a rather technical nature, a Veterinary Inspector faced with this problem could not do better than consider becoming a member of the Association's own Pension Scheme.

This scheme, which, incidentally, not only meets the needs of the member himself upon retirement but also fully protects his dependents in the event of his premature death, still offers very favourable terms, whilst a most important feature at the present time is that policies effected thereunder include War Risks Cover in the United Kingdom whilst the policy-holder remains a civilian, to the extent of the capital sum benefit (the income benefit being cancelled if death should occur from this risk). It is interesting to note, too, that the Assurance Society concerned at present regards as a civilian a member of the Civil Defence Services or the Home Guard, as at present constituted, provided he is part-time and unpaid.

It is pleasing to know that the scheme is still, after eight years, abreast of modern conditions and any part-time Veterinary Inspector of the Animal Health Division

of the Ministry of Agriculture and Fisheries—or for that matter any member of the Association—wishing to examine this vital question of retirement provision, can look to the Association's own scheme with complete confidence.

Any member who would like to have details of the scheme in its present form should communicate with the General Secretary, at 10, Bore Street, Lichfield, or with Mr. Walter Herriot, whose present address is Union Bank Building, 66, George Street, Edinburgh, 2.

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Victoria Veterinary Benevolent Fund Christmas Gifts

Readers are reminded that contributions to the Christmas Gift Fund should be sent to the Secretary at 18, Victoria Avenue, Harrogate. All gifts received by the 20th instant will be used to send presents to the aged, including a few members incapacitated on account of age, and to widows with orphan children.

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R.C.V.S. OBITUARY

Bowman, George Emerson, 173, Woodhouse Lane, Leeds, Yorks. Graduated Edinburgh, April 18th, 1872. Died November 28th, 1941; aged 90 years.

Over, Reginald H. H., *T.D.*, Woodville, 37, Bilton Road, Rugby, Warwick, Major R.A.V.C. (T.A.) (retd.). Graduated London, May 29th, 1894. Died December 2nd, 1941; aged 68 years.

Redmond, Patrick Gabriel, Brynaraul, College Street, Ammanford, Carms. Graduated Dublin, December 19th, 1938. Died November 9th, 1941; aged 29 years.

Wilson, William Frederick, The Hundred House, Hodnet, Salop. Graduated London, December 17th, 1902. Died November 30th, 1941; aged 64 years.

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Mr. G. E. Bowman, M.R.C.V.S.

In the passing of Mr. George Emerson Bowman, of Leeds, at the great age of 90 years, the profession mourns the loss of a fine veteran of outstanding worth, and the National Veterinary Medical Association a staunch supporter whom it most fittingly honoured with the Presidency in 1909. We are indebted to Mr. William Crawford, M.R.C.V.S., of Leeds, for the following tribute.

"Many of the older members of the veterinary profession will learn with regret of the death at the age of 90 of Mr. Geo. E. Bowman, of Leeds, which took place at his home on November 28th.

As one who had been a neighbouring practitioner for 40 years, I can say that from the first day to the last the older man always helped me: Mr. Bowman was, indeed, ever ready to assist a colleague.

As a man he had a charming manner and he made everyone happy and cheerful in his company, and all who knew him enjoyed spending any length of time with him. He took a great interest in the veterinary profession and those who are left from the 1909 "National" at Harrogate will remember how he helped as President to make it such a huge success.

He was up to the last war a keen rider to hounds and could always find a case to visit that took him in the district where hounds met. He was liked by all who knew him and was in active work up to a few months before his death, thinking nothing of firing a hunter or castrating a colt when he was well in the eighties. He always gave his opinion without fear and I should say few practitioners made less mistakes. He held many appointments in his district and he never lost them till age limits compelled him to relinquish the work."

Mr. Bowman was for many years the Veterinary Inspector to Leeds Corporation and the Ministry of Agriculture, veterinary officer of the Yorkshire Agricultural Society, and twice President of the Yorkshire Veterinary Medical Society. He was veterinary surgeon to the Princess Royal's hunters. Before beginning his practice in Leeds in 1881, he was associated with his brother in the care of the famous stud at Sledmere.

Racing owned Mr. Bowman as an active supporter, and for many years he had one or more horses of his own. In 1879, he won the Ebor Plate and the Southport Hunt Cup, and it is doubtful if there is a course in Yorkshire on which he had not ridden. He won the Weatherby Steeple Chase with Wharfedale, a horse he hunted for three seasons.

The funeral took place at Elvington, near York, where Mr. Bowman was a landowner. The service was conducted by the Rector, the Rev. A W. Jackson, and the large attendance included Mr. J. W. Procter (President of the Yorkshire Veterinary Medical Society) and Mr. W. Crawford.

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Major R. H. H. Over, T.D., M.R.C.V.S.

We have also to record with deep regret the death of a loved and familiar figure in the Midlands, Major R. H. H. Over, of Rugby, to whose revered memory we are glad to be able to publish the following tribute.

"His many friends in the profession will learn with regret of the death of Major Over, of Rugby, at the age of 68. For many years he had practised in the Midlands where, after qualifying in 1894 at the London College, he joined his uncle, the late Mr. A. Over, in the large practice carried on at Rugby.

Reginald Over, although a busy man, devoted a great deal of interest to the well-being of his profession. He had been an enthusiastic member of the National Veterinary Medical Association for many years, and had served as a representative of the Midland Counties Veterinary Association on the Council of the "National," and as a member of the Organising and Appointments Committees.

It is in particular connection with the Midland Counties Veterinary Association that the name of Over is associated. His uncle was one of the founder members of this Association in 1867, and occupied the Presidential chair in 1896. He was an outstanding figure and a contemporary of such men as Olver of Tamworth, Trigger of Newcastle, Russell of Grantham and others, prominent names in those days among the ranks of general practitioners.

Reginald Over occupied the Presidential chair of the Midland Association in 1920, and during his year of office he entertained the members of the Midland Association at the Rugby Conservative Club. Those who were present on that occasion will remember the happy and genial companionship of uncle and nephew. In addition to holding office as President, Reginald Over presented several papers at different times, and was a regular attender at most of the meetings.

He was associated with the Territorial Army movement for many years, and held the Territorial decoration; he was President of Rugby Howitzer Battery Comrades Association, whilst for many years he was Chairman of Rugby Conservative Club.

To his widow and family deepest sympathy will be extended, and his many friends in the Midlands will feel the loss of an outstanding colleague and friend, who throughout his life maintained the dignity of his profession and was well liked by all."

H. W. D.

At the funeral service at the Parish Church on December 5th, many friends were present, and the profession was represented by Messrs. W. L. Sheffield,

S. V. Collard, R. B. Palmer, W. L. Glascoyne, A. A. Forsyth and H. W. Dawes (representing the N.V.M.A. and the M.C.V.A.).

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MINISTER ON NEED TO INCREASE STOCK

Addressing a meeting of farmers, farm workers and landowners at Preston on Friday of last week, Mr. R. S. Hudson, Minister of Agriculture, said that extensive tours of the country had convinced him that Britain is considerably under-stocked, and that to maintain the fertility of the land it is now necessary to have more sheep and beast cattle. Sheep especially, and also more young cattle or calves must be reared extensively for grazing the temporary pastures, which the Minister regards as an essential part of his policy. In this way fertility can be maintained and more meat produced.

Referring to poultry, Mr. Hudson said that primary importance was attached by the Government to replacement of old birds not worth their keep with healthy, well-bred, productive stock. A special issue of chick feed, including some grain, would be made to commercial poultry keepers and to approved poultry breeders to maintain an adequate nucleus of sound breeding stock.

Commercial poultry keepers who wanted to rear their own replacements would get an extra ration for chick rearing from January to April to enable them to rear one-third of their pre-war numbers.

Breeding and rearing by 1,000,000 domestic poultry keepers would be discouraged, but approved poultry breeders and those with stock provided by country poultry panels would get extra rations to rear the millions of pullets needed. These would be made available to "backyarders" at a reasonable price to replace old stock.

Ordinary rations for the hen population, added Mr. Hudson, would remain on their present basis.

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FARMLAND'S FUTURE

Under the above heading the following article on a subject of much interest to our readers, is contributed by S. L. Bensusan to the November issue of *The Fortnightly Review*.

Questions of land tenure are so highly controversial that they cannot be discussed within reasonable limits, but it is impossible for the most impartial observer to ignore the trend of expert opinion towards nationalisation. In the past few years more and more men, whose interest in the future of the soil of Britain is not affected by party politics, have declared themselves in favour of the change for which Lord Addison in his great book *A Policy for British Agriculture* has advanced so powerful a plea. Opponents of drastic change are limited and are led by men who can still control agricultural estates effectively, generally by the aid of their private means or big business interests.

One of the main causes of the attitude of experts is awareness at long last of the shocking state into which our fields had fallen when war smote us in 1939. This condition was the aftermath of the 1914-1918 period, when land values rose and landlords sold out while the Government passed a Corn Production Act in one year and repealed it in the next. Farmers could not carry their newly-acquired freeholds, a terrible slump in values ensued, and clean land went out of fashion.

Under the old dispensation, great landlords, to whom less than justice has been done, administered their estates strictly. Tenancy agreements insisted on certain crop rotations and kept straw and hay for use on the farm. Buildings were maintained, remission of a part of the rent would be given in bad years. The landlord had his amenities, his shooting and hunting and fishing; these were his chief reward and sufficed him even when rents fell and rates, tithes with perhaps mortgage interest, pressed heavily. In fact, the land was strongly held, there was no rush to sell until prices soared. "I've passed from 2 per cent. on farms to 4½ in first-class securities," a great landowner told me when the term "great" had certainly ceased to apply as a measure of ownership. While the crisis in farming spread ruin, the Government of the day, no matter whether it was that of Mr. MacDonald, Mr. Baldwin or Mr. Chamberlain, did nothing worth doing; indeed, the last-named hinted on one occasion that farming could not look for most-favoured nation treatment. Assurances to the farming community were based on vote values and, as a Minister once remarked to the writer: "Agriculture is always at the bottom of the Cabinet Agenda."

Now that millions have been spent and still more must be spent on breaking up grassland, ditching, hedging, draining and feeding starved soil, the cost has fallen upon the State and the impossibility of allowing the farmlands to revert again to prairie has impressed itself upon the dullest imagination. But can we be sure that we have learned through adversity to recognise that we have no finer and more enduring asset than our farms? Do we accept the duty imposed upon us of seeing that the best possible use is made of them and that they are not left to the mercy or the whim of the industrialists?

I have been reading of Curlew Moss in Lancashire where 75 acres now reclaimed had been lost to use under six feet of bracken, willow-herb, bushes and brambles. Lately I have seen still larger areas in Essex, once London's granary, that had been bought by land speculators for the sake of road frontages. Only these frontages concerned them, they allowed th rest of the land to go to ruin; war-time clearance cost about £8 an acre and was only possible by the aid of heavy machinery. From Lancashire to Essex is a far cry, but a like story can doubtless be told all through the intervening countryside. There is no law to keep any man from buying as many acres of England as he can pay for and, having bought, he can allow them to fall into complete ruin. Under the stress of war an Agricultural Committee can take over and cultivate land after having it valued, but the tenure will extend only to the end of war and three years later. Then the owner can recover if he will pay for the improvements, and the farm will be his to do what he likes with. In Essex much of the waste land of speculators is ownerless. Many of those who bought it and could not sell frontages, together with those who sold out, have disappeared; it has proved impossible to trace them; the land has been proclaimed, taken over and is now the property of the county authority. Most people will agree that the Britain of the future must be strongly held, but in the absence of capable landlords who understand and dictate proper acts of husbandry, only the State remains.

The Great War caught us napping, but in 1939 the position of English agricultural land was much worse than it had been 25 years earlier when so many of the old landlords were carrying on. The one factor that has saved the situation through the crisis has been the development of agricultural machinery. Even those of us who hope that the countryside of the future will hold small cultivators in great and ever increasing numbers must admit the debt we owe to-day to the 70,000 first-class tractors that have grown out of 1,500 doubtful ones of the earlier war period. They have accomplished a vast task in record time and made the road clearer for associations like the Homecroft and Catholic Land which seek to give the small man his chance and re-establish rural England. Yet while we recognise and are grateful for the help given to farming, and the splendid service of the County Committees, we must bear in mind that where agriculture is involved the effort must be sustained. If Committees lose their powers after the war, if agriculture remains at the bottom of the Cabinet agenda, if the claws of the land speculator are not pared, the old bad conditions inevitably will

return. Nature endures clean land and sound cultivations, but does not welcome them. She loves a prairie and will create one where and when she can.

Talking to the Farmers' Club in December last, the Minister of Agriculture said the people of this country should learn to regard the pursuit of a healthy and well-balanced agriculture as an essential part of our post-war policy. Most sane folk will agree with him, but many will remember that similar statements were made in 1919. Some may ask why, since Viscount Lee of Fareham left Whitehall Place, successive Cabinets have persistently obstructed his successors in the pursuit of stable conditions.

Let us suppose for the purpose of further argument that the value of our soil is to be recognised, that the land of Great Britain is to have a fair chance and that we shall seek to develop it in peace as in war. What is the most important prerequisite? Is it not that those who handle the land should know something about proper acts of husbandry? Land is not and cannot be the property of any individual. The proudest landlord is no more than a tenant for life, with or without power of appointment; the landlord dies, the land remains. A few inches of the earth's surface constitute mankind's greatest asset and the bounden though neglected duty of every generation is to pass it on to the next unexhausted, and as well cultivated as may be. Among many primitive tribes, as students of Lord Hailey's masterly *African Survey* will remember, this principle is observed; in the most highly civilised communities it is ignored. The exploitation of the soil in the United States and Canada, to name but two countries, has robbed millions of acres of their fertility for no better reason than that under existing laws the rights of the land can be violated and those of the next generation may be ignored.

It is common knowledge that nearly a century past the new world has been selling fertility to the old in return for manufactured products. Now that the new has ceased in large measure to be dependent upon the old, farmers find much of their natural wealth lost, while, in Great Britain at least, the ability to buy food cheaply in foreign markets has produced the derelict acres, so sore a present concern to our rulers. The proportion that was badly farmed or even ranched down to 1939 was terribly high. This is not the mere opinion of the writer, who may claim to have visited every county in England, Scotland and Wales several times in the last 15 years; it is the general verdict of the War Agricultural Committees, and until the underlying problem is solved, there can be no lasting improvement.

Consider the laws that regulate the professions. Should a man desire to be a doctor, a veterinary surgeon, a lawyer, an architect, or an engineer, he must undergo a course of training and satisfy shrewd examiners before he is free to practise. His failure or success will matter to few save himself. But if he has money and an ambition to handle the world's greatest asset, that upon which all life—human, animal and vegetable—depends, he is free to buy the best on the market and, having bought, to beggar it. Agriculture has been and may yet be again our greatest national industry, the soil must remain our best asset. Is it not time, if agriculture is to be all that our rulers promise, to treat farming as a profession, to demand a standard of proficiency and so to regulate agricultural practice? Should we not say that no man shall enter upon land without satisfying a competent authority that he understands the principles of farming and is in a position to carry on the work properly, that is to say by keeping sufficient staff, stock and implements to render justice to his holding? If he is a good man and cannot work unaided, he should have access to the necessary means. This involves recognition of the basic truth that the land belongs to the nation and that no generation can ever be more than the trustees for its successors, that the country is the proper breeding ground for all three kingdoms, human, animal and vegetable, and that he who wastes or spoils cultivable land should be deprived of its control. Though this proposal is bound to offend, it is in truth only giving permanency to principles the war has established and it is free from all taint of politics.

The application of the principles set out here need give no trouble. Sitting tenants are already farming under sulrveillance, the County Agricultural Committee can lend them machinery, give them advice, or even take over their and. The only bad side of this present method is that the country is putting money into the pockets of certain indifferent farmers by doing their work and leaving them to reap the profits, and that in the long run all these Government aids are in existing circumstances a grant to landlords. Even then there is a benefit to the community as well as the individual while no man suffers disturbance unless the County Authority decides that he is quite unable to farm properly. Whether individual or state ownership prevails, some tribunal should exercise its function when a farm becomes vacant. Presuming it to be a sub-committee of the chief county organisation, members should inspect land and buildings to decide how the place must be farmed in the interests of the community, and what capital or credit an applicant should possess. Then the man who proposes to farm would be put through his paces and called upon to show qualifications for handling a part of the nation's most enduring wealth. Extensive as opposed to intensive farming would be ruled out, so would neglected hedges and choked ditches. A balance would be required between arable and grass, and a proper proportion of livestock demanded by a mixed farm, with a view to restoring or maintaining the humus that "artificials" tend to destroy—all official statements to the contrary notwithstanding.

There might well be a return to some of the farming covenants in general use before the great land sales that followed the 1914-1918 war. Under these, rotations were laid down and the sale of hay or straw was strictly forbidden. England was better cultivated when such limitations were imposed and accepted. There was far less farming for Friday night; land did not go out of production, nor did arable tumble down to grass. The major part of our latter-day trouble is due to the fact that farmers paid too much for their holdings twenty years or so ago and, having borrowed from the banks and lost the protection of the Corn Production Act, were in many cases forced to farm in a fashion that would have shocked their fathers.

This war is providing a chance, perhaps a last chance, of returning to wiser methods while asserting the principle that all land under whatever tenure must be handled in the interest of the nation as a whole.

As the science of destruction proceeds apace, and certainly no other science has kept pace with it, new and more dangerous methods of injuring the land interests are bound to come. The dive bomber and the magnetic mine will have their successors and the danger to seaborne supplies is hardly likely to lessen. It follows that we must rely more and more upon our resources, and we can only do this if those entrusted with farms are qualified to turn them to good account and if the small cultivator is brought back and made welcome in the countryside that is his proper heritage.

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RATIONALISATION OF RESEARCH

In the course of a leading article, under the above heading, in its issue of November 29th, *The Pharmaceutical Journal* makes the following reference to an important development noted in our issue of last week: "By the setting up of the Therapeutic Research Corporation of Great Britain, Ltd., five well-known firms have agreed that they will work together in order to coordinate and extend research. They will pool manufacturing facilities, use a common name for new medicinal substances, and generally act in unison instead of

as competitors in the field of therapeutic investigation. A movement such as this is likely to have a profound effect on the future development of pharmacy and medcine; if one effect is to eliminate the superfluity of brand names for a single chemical much will have been achieved. We would also like to think that the co-operative attitude of the Corporation will be shown by the inclusion in the scheme of other firms of recognised standing of which several have made, through the British Pharmaceutical Conference and in other ways, extremely valuable contributions to medical and pharmaceutical knowledge."

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MINISTRY OF AGRICULTURE WEEKLY NEWS SERVICE

New Status for Farming

Effect of Increased Wages on Food Prices.—It is fitting that the new status of agriculture in our national economy should be reflected in a higher minimum wage for farm workers. Acting on the observations of the County Agricultural Wages Committees, the Agricultural Wages Board reached a unanimous decision to increase the national minimum wage for regular adult male workers from 48s. per week to 60s. They have thus accorded popular recognition to a craftsman who has few equals.

Commenting on this development in the House of Commons, the Minister of Agriculture said it had always seemed to him to be wrong that the agricultural labourer should have been regarded as properly the recipient of the lowest rate of wages in the labour market. "We shall now have the problem of adjusting farmers' returns to cover the increase in costs of production due to this increase of wages," Mr. Hudson added. "It is not going to be an easy task but I have no doubt that we shall be able to accomplish it. You cannot pay the agricultural worker of this country a decent wage unless you are prepared to pay a reasonable price for the food which he helps to produce, a price which will enable the farmer to continue not only cultivating the land, but maintaining it in a proper state of fertility."

The money to meet this wage increase, as Mr. Hudson pointed out, will have to come from the consumer or out of the taxpayer's pocket. The old cry of cheap food had helped to depress agricultural wages. If, after the war, we were to depend for the employment of many millions of our people on the manufacture of goods for export, our interest was to see that the great consuming countries of the world, which were primarily agricultural countries, were prosperous enough to buy the goods we manufactured. They could only be prosperous if we paid them a decent price for the food they sent us.

Addressing the annual meeting of Stockton-on-Tees Clydesdale Horse Society, Mr. J. Wade said he was convinced there was a future for heavy horse breeding, and the Government was evidently of that opinion as it had decided to renew the grants. While all were agreed that tractors did good work, there would always be a demand for heavy horses.

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We would direct the attention of those of our readers who may be able to attend, to the notification in our Notices column of the next meeting of the Section of Comparative Medicine of the Royal Society of Medicine, on Wednesday, December 17th, when in the series of discussions on the control of diseases of cattle inimical to man, the subject of tuberculosis will be considered. The openers are Professor T. Dalling and Dr. S. Roodhouse Gloyne.

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Messrs. C. J. Hewlett & Son, Ltd., 35-42, Charlotte Road, E.C.2, request us to remove any misunderstanding arising from the use of the phrase "In view of the difficulty in obtaining apparatus" by the author of the illustrated letter regarding an apparatus for udder and intravenous infusions published in our issue of November 29th, by assuring our readers that their Neo Injector is readily available for the former purpose.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period.	Anthrax.		Foot-and-Mouth Disease.		Parasitic§ Mange.		Sheep Scab.	Swine Fever.	
	Outbreaks confirmed.	Animals attacked.	Outbreaks confirmed.	Animals slaughtered as diseased or exposed to infection.	Outbreaks confirmed.	Animals attacked.	Outbreaks confirmed.	Outbreaks confirmed.	Swine slaughtered.
	No.	No.	No.	No.	No.	No.	No.	No.	No.
Period 1st to 15th Nov., 1941	8	9	1	222	—	—	9	18	13
Corresponding period in ...									
1940	27	40	14	2,087	—	—	22	239	142
1939	20	23	3	1,115	—	—	10	225	199
1938	36	49	4	449	1	1	25	89	62
Total 1st January to 15th Nov., 1941	362	431	260	26,808	17	51	169	1,014	498
Corresponding period in 1940	497	595	49	8,961	15	29	163	4,450	3,203
1939	645	731	85	10,897	32	72	224	2,775	2,101
1938	716	1,109	169	21,261	45	75	155	741	575

NOTE.—The figures for the current year are approximate only. §Excluding outbreaks in Army Horses.